

Work Order ID 60164

Monday, June 28, 2010 11:47:29 AM

Page 1

Item ID: D205-634-041

Accept

Revision ID:

Item Name: Replacement Skidtube

Start Date: 6/28/2010 Start Qty: 1.00

Required Date: 7/2/2010 Req'd Qty: 1.00

Reference:

Approvals: Process Plan: *RL*Date: *7/6/10*

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run

Start

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

Draw Nbr

Revision Nbr

D2580

Rev D

0.00



DOCUMENT CONTROL

0.00

DC

Memo

Document Control

Photocopy D205-634 bluefile & type labels per PPP D205-634-041 CHG002

*N/A**7/10/10*

0.00

110



BENDING MACHINE - SKIDTUBES

0.00

CNC Bend 1

Memo

CNC Delta 100 Bender

1-Bend as per program D2580.C on CNC Bender and Folio 16

2-Cut tubes as per Dwg. D2580

3- scribe batch# in aft end of tube

) 7/10/10

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

120

0.00



Skidtubes

Memo

0.00

Skidtubes

1- Deburr ends

2- C'sink holes as per dwg without cutting fluid

3- Prepare tube for welding, remove alodine as required.

4- Scribe batch number insied aft end of tube.

①

BR 10/07/08

130

0.00



QC

QC5- Inspect part completeness to step on W/O

Memo

0.00

Quality Control

8 10/07/05

⑦

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Process Plan:

Date:

Tooling:

Date:

Run Start

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

140

0.00

Skidtubes

Skidtubes

Memo

0.00

1-Weld step D2576 as per Dwg. D2580 and QSI 004
A/R□□□ Aluminum Rod *M114242*

2-Prep per QSI 005 and weld crossbolt spacers D2579 as per Dwg. D2580, QSI 004.
For D2579 spacers, weld one side, pass 3/8" drill, weld other side, pass 3/8" drill
A/R□□□ Aluminum Rod *M114242*

3-Grind welds as per Dwg D2580 Grind flush ridge made from bending

4-Drill holes for wearplates using DT 8217 & DT8937 Open holes to 19/64",
adjust stopper not to hit web. Deburr

5-Counterbore crossbolt spacers to 7/16" ID x 1.0" deep as per Dwg D2580.
Deburr holes

6-Drill pilot holes for aft cap using DT 8215 Open holes to 0.208". Deburr

7-Drill pilot holes for Tow ring using DT8091, open to .640" and Deburr

41

BE 10/20/07

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Reference:

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Process Plan:

Date:

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/
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Run Hours

Tool ID

Tool #

Plan
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QtyReject
QtyReject
NumberInsp.
Stamp

180



Powdercoat

Powder Coating

White Gloss(Ref:4.3.5.1) per OSI005 4.3-Alum

M1114841

0.00

Memo

0.00

START TIME:

OVEN TEMPERATURE:

FINISH TIME:

9:00
3:20
7:30

① BX 10-7-8.

190



QC

Quality Control

QC3- Inspect Part Finish

Memo

0.00

0.00

⇒ M 10103113

② d

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Item ID: D205-634-041

Accept



Setup Start



Revision ID:

Stop



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Start Date: 6/28/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 7/2/2010 Req'd Qty: 1.00

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
200		0.00							
	HandFinish								
Hand Finishing	Memo	0.00							

=) J & L 10/07/13

M

P

1-Install inserts & wearplates & Gaskets as per Dwg. D2580. Use a drop of Sikaflex on insert holes before installing wearplates

A/R ☐ ☐ Sikaflex-291 ☐ M113579

Sikaflex expire date: 10/9/11

2-Coat D2594-3 O' rings with Petroleum Jelly and install on D2594-1 plugs as per Dwg D2580

3-Inspect for foreign object per QSI 024

4-Install 2855 Aft Cap as per Dwg D2580 and seal Fwd Step & Aft Cap with Sikaflex. Clean excess adhesive

A/R ☐ ☐ Sikaflex-291 ☐ M113579

Sikaflex expire date: 10/1/11

5-Wing Wall as per Dwg D2580 and QSI 005 4.4

Batch: 114332

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Customer:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run

Start

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

210



QC

Quality Control

QC5- Inspect part completeness to step on W/O

0.00

Memo

0.00

Inspect Aft Cap, Fwd Step and Wing Walk of work to Current Step Inspect for Foreign objects per QSI 024

220



Packaging

Packaging

Packaging

0.00

Memo

0.00

Identify and pack for shipping as per PPPD205-634-041

Location:

PPP Rev:

PPP 59602

230



QC

Quality Control

QC21- Final Inspection - Work Order Release

0.00

Memo

0.00

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Picklist Print

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Page 1/5

Work Order ID: 60164

Parent Item: D205-634-041

Parent Item Name: Replacement Skidtube

Start Date: 6/28/2010

Required Date: 7/2/2010

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:N 02.08.28 FP was QC5 in Step 27; Added QC5 to Step 30 KJ
 IPP Rev P 10.02.19 per PAR09-043 EC verified by:DD
 IPP Rev. O 06.02.28 Added paperwork EC
 IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D2580-1 205 Skidtube bent detail		Manufactured	No			110	Each	5.0000	1	1			
				<u>Location</u>			<u>Loc Qty</u>		<u>Loc Code</u>				
				LG			5						
				57028			1						
				59297			2						
				59299			2						
D2576-3 Step (maching detail)		Manufactured	No			140	Each	92.0000	1	1			
				<u>Location</u>			<u>Loc Qty</u>		<u>Loc Code</u>				
				LG			92						
				46661			44						
				52215			48						
D2579 Crossbolt Spacer		Manufactured	No			140	Each	353.0000	20	20			
				<u>Location</u>			<u>Loc Qty</u>		<u>Loc Code</u>				
				LG			353						
				57052			5						
				57348			4						
				58433			54						
				59113			290						

1359297 ① 11/07/11

BE 10/07/07

20 BE 10/07/07

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Page 2

Work Order ID: 60164

Parent Item: D205-634-041

Parent Item Name: Replacement Skidtube

Start Date: 6/28/2010

Required Date: 7/2/2010

Start Qty: 1.00

Required Qty: 1.00

D2855



Cap

Manufactured No

200 Each

86.0000

1 1



Location

Loc Qty

Loc Code

FP6

2

56613

2

ST026

84

50513

1

50770

28

51539

2

53791

53

200

Each

1,303.000

2



AN3-5A



Bolt

Purchased

No

Location

Loc Qty

Loc Code

ST350

1303

105057

803

115016

500

200

Each

3,433.000

2



AN960JD10L

NAS1149D0332J

Purchased

No



Washer

Location

Loc Qty

Loc Code

ST348

3433

110985

3433

200

Each

17.0000

50



ALS7-1032-130

Purchased

No



Insert

Location

Loc Qty

Loc Code

ST282

17

113238

17

1114723

x50 10/07/13

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Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES					
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Page 3

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Parent Item: D205-634-041

Parent Item Name: Replacement Skidtube

Start Date: 6/28/2010

Required Date: 7/2/2010

Start Qty: 1.00

Required Qty: 1.00

AN3C4A

Purchased

No

200

Each

2,259.000

50

50



BOLT

Location

Loc Qty

Loc Code

ST350

2259

114103

501

114108

14

114416

12

114523

2

114839

730

114941

1000

11115000

AN960C10L

NAS1149C0332
R

Purchased

No

200

Each

0.0000

50

50



washer

D3566-13

Manufactured

No

200

Each

37.0000

1

1



Gasket

Location

Loc Qty

Loc Code

FP

14

53461

14

FP012

23

59661

23

D3566-5

Manufactured

No

200

Each

24.0000

1

1



Gasket

Location

Loc Qty

Loc Code

FP015

24

57682

2

59138

22

x 50 10/07/13

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Shop Packet Print

Page 3

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Page 4

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Parent Item: D205-634-041

Parent Item Name: Replacement Skidtube

Start Date: 6/28/2010

Required Date: 7/2/2010

Start Qty: 1.00

Required Qty: 1.00

D3566-1 Manufactured No 200 Each 25.0000 2 2



Gasket

Location Loc Qty Loc Code

FP015 25
57715 2
58182 1
59126 22

D3564-11 Manufactured No 200 Each 1.0000 1



Wearshoe

Location Loc Qty Loc Code

FP019 1 1359941
59021 1

D3564-13 Manufactured No 200 Each 8.0000 1



Wearshoe

Location Loc Qty Loc Code

FP17 8
57922 8

D3564-9 Manufactured No 200 Each 16.0000 1



Wearshoe

Location Loc Qty Loc Code

FP 1
55334 1
FP019 15
57958 2
59201 13

Y2 10/07/13

X1 10/07/13

X1 10/07/13

PT 10/07/13

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Start Date: 6/28/2010

Required Date: 7/2/2010

Start Qty: 1.00

Required Qty: 1.00

D3564-5

Manufactured No

200

Each

22.0000

1

1



Wearshoe

Location

Loc Qty

Loc Code

FG

1

34806

1

FP19

9

57525

1

58709

8

FP-19

12

59157

12

D2594-3

Manufactured No

200

Each

539.0000

16

16



O-Ring, 205 Skidtube

Location

Loc Qty

Loc Code

FP

539

55546

19

58191

28

59358

492

D2594-1

Manufactured No

200

Each

499.0000

16

16



Plug, 205 Skidtube

Location

Loc Qty

Loc Code

FP

190

42807

112

55002

71

57826

7

FP14

309

58434

120

59110

189

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DART

DESIGN <i>[Signature]</i>	DRAWN BY <i>[Signature]</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D2580	REV. D SHEET 1 OF 3
DATE 07.02.27		TITLE 205 SKIDTUBE ASSEMBLY	SCALE NTS
A	96.09.16	NEW ISSUE	
B	96.12.02	AS MANUFACTURED	
C	98.08.26	REDRAWN, INCLUDED DEO 9094/9097	
D	07.02.27	CHANGE TO SS WEARPLATES AND GASKETS, INCLUDE DEO 9124/9183	

RELEASED
07.06.28 *[Signature]*

QTY -041	QTY -045	Part Number	Description
X		D2580-041	SKIDTUBE ASSEMBLY
	X	D2580-045	SKIDTUBE ASSEMBLY
1	1	D2500-1-190	EXTRUSION
1	1	D2576-3	STEP
20	24	D2579	CROSS BOLT SPACER
16	16	D2594-1	PLUG
16	16	D2594-3	O-RING
1	1	D2596	205 WEB
1	1	D2855	AFT CAP
1	1	D3564-5	WEARSHOE
1	1	D3564-9	WEARSHOE
1	1	D3564-11	WEARSHOE
1	1	D3564-13	WEARSHOE
2	2	D3566-1	GASKET
1	1	D3566-5	GASKET
1	1	D3566-13	GASKET
50	50	ALS7-1032-130 or AKS7-1032-130 or AKS4-1032-130 or AELS-1032-130	INSERT
50	50	AN3C4A	BOLT
2	2	AN3-5A	BOLT
50	50	AN960C10L	WASHER
2	2	AN960JD10L	WASHER

SHOP COPY
RETURNED
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO ADMIN. MGMT
WITHOUT NOTICE
WORK CENTER
NO. *40104*
BS10622

GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 2) ALL DIMENSIONS ARE IN INCHES
- 3) INSERT D2596 WEB TO LOCATION SHOWN OFF AFT END OF SKIDTUBE AND BOND WEB INTO OUTER TUBE WITH NON-STRUCTURAL SIKAFLEX-241 ADHESIVE PER DART QSI 015 BEFORE BENDING. ENSURE HOLES LINE-UP.
- 4) BEND AS A SMOOTH RADIUS STARTING WITH A MAXIMUM CENTERLINE RADIUS OF 60 AND ENDING WITH A MINIMUM RADIUS OF 30. A MAXIMUM REDUCTION OF 0.200 IN DIAMETER IS ALLOWABLE IN THE BENT PORTION OF THE TUBE.
- 5) USE DART DRILL TEMPLATE TD2577-205 TO LOCATE AND DRILL $\varnothing 0.297$ HOLES FOR WEARSHOE INSERTS. INSTALL ALS7-1032-130 PER SECTION D-D (50 PLACES) AFTER FINISH. INSTALL AN3C4A BOLTS AND AN960C10L WASHERS WITH SIKAFLEX-241/-291.
- 6) WELDING TO BE DONE PER DART QSI 004.
- 7) FINISH:
SEE NOTES ON
PAGE 2 FOR D2580-041 AND
PAGE 3 FOR D2580-045
- 8) INSERT D2594-1 PLUG C/W D2594-3 O-RING IN HOLES MARKED 'P' (BOTH SIDES OF TUBE) AFTER FINISH (16 PLACES).

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DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

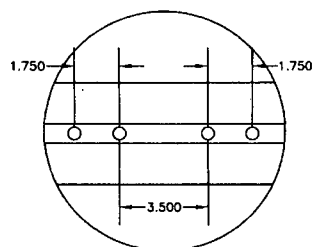
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

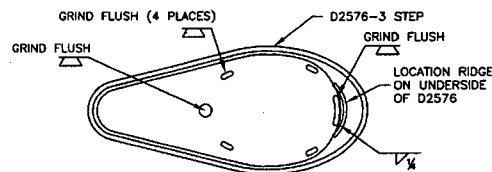
NCR:		WORK ORDER NON-CONFORMANCE (NCR)							
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector	
			Initial Chief Eng	Action Description Chief Eng	Sign & Date				

NOTE: Date & initial all entries

DETAIL A
SCALE 5:24

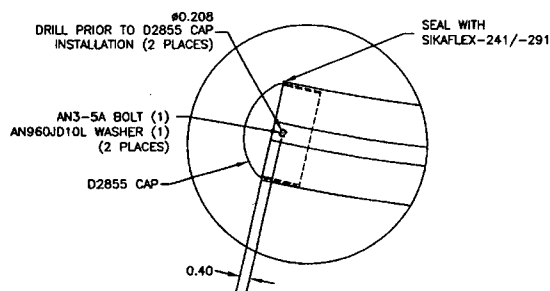


DETAIL B
SCALE 5:24

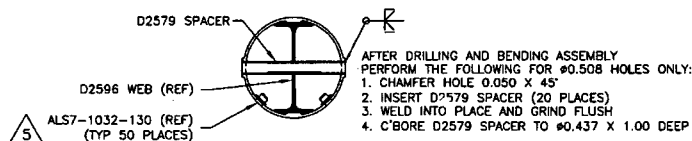


RELEASED
07.06.28

DETAIL C
SCALE 5:24



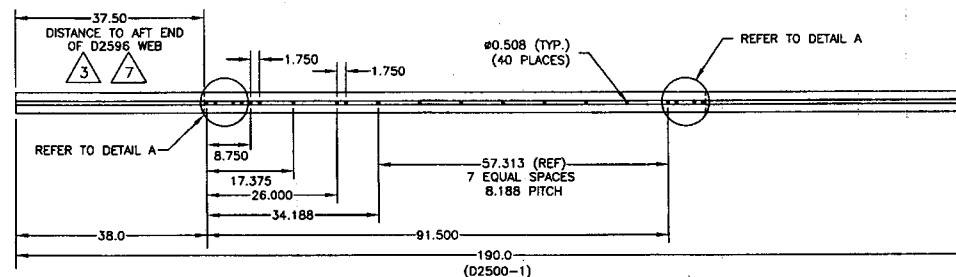
SECTION D-D
SCALE 5:24



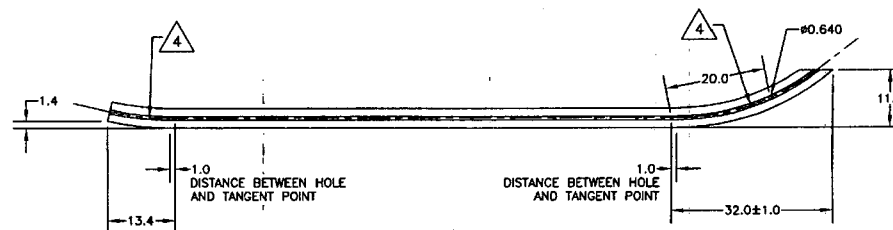
D2580-041 NOTES

- i) FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB
POWDER COAT ASSEMBLY GLOSS WHITE (REF. 4.3.5.1) PER DART QSI 005 4.3
BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4

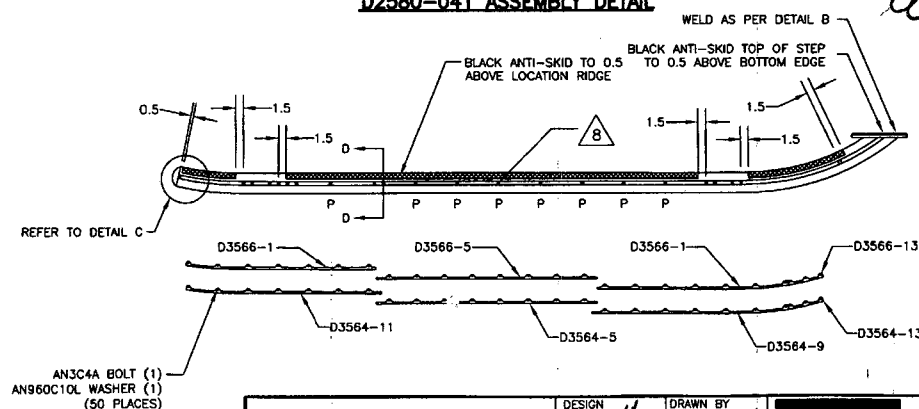
D2580-1 DRILLING DETAIL



D2580-1 BENDING AND CUTTING DETAIL



D2580-041 ASSEMBLY DETAIL



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DESIGN	DRAWN BY	DART	DART AEROSPACE LTD.
CHECKED	APPROVED		HAWKESBURY, ONTARIO, CANADA
DATE	DRAWING NO.	D2580	REV. D
07.02.27	TITLE	205 SKIDTUBE ASSEMBLY	SHEET 2 OF 3
	SCALE	1:24	

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

RELEASED
07 Dec 78

Diagram illustrating the grinding locations on the propeller cross-section:

- GRIND FLUSH (4 PLACES)
- GRIND FLUSH
- D2576-3 STEP
- GRIND FLUSH
- LOCATION RIDGE ON UNDERSIDE OF D2576
- $\frac{1}{4}$

Diagram illustrating the rear view of the engine cover assembly. The diagram shows the installation of the AN3-SA bolt (1) and the D2855 cap. The bolt is secured with the AN960JD10L washer (1) (2 PLACES). The cap is secured with the D2855 cap. The seal is applied with SIKAFLEX-241/-291. A dimension of 0.40 is indicated for the distance from the bolt to the edge of the cover. A note refers to SEE NOTE ii).

5

D2579 SPACER

D2596 WEB (REF)

ALS7-1032-130 (REF)
(TYP 50 PLACES)

AFTER DRILLING AND BENDING ASSEMBLY
PERFORM THE FOLLOWING FOR #0.508 HOLES ONLY:

1. CHAMFER HOLE 0.050 X 45°
2. INSERT D2579 SPACER (20 PLACES)
3. WELD INTO PLACE AND GRIND FLUSH
4. C'ORE D2579 SPACER TO #0.437 X 1.00 DEEP

i) FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB
POWDER COAT ENTIRE ASSEMBLY GREEN (REF. 4.3.5.8) PER DART QSI 005 4.3
BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4

ii) IT IS ACCEPTABLE TO GRIND A RELIEF IN THE D2855 AFT CAP TO PREVENT INTERFERENCE
WITH THE SPACER AT THIS LOCATION

37.50
DISTANCE TO AFT END
OF D2596 WEB

3
7

1.750 1.750

0.508 (TYP.)
(40 PLACES)

REFER TO DETAIL E

REFER TO DETAIL A

8.750

17.375

26.000

34.188

57.313 (REF)
7 EQUAL SPACES
8.188 PITCH

38.0

91.500


190.0
(D2500-1)

(MAKE FROM D2380-1 DRILLING DETAIL)

5.985
1.4
51.340
5.338 (REF)
39.580
5.915
3.630 (REF)
Ø0.508 (8 PLACES)
Ø0.640
20.0
11
1.0
DISTANCE BETWEEN HOLE AND TANGENT POINT
1.0
DISTANCE BETWEEN HOLE AND TANGENT POINT
32.0 ± 1.0
13.4
4
4

[illegible]

W6 60164

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	CHECKED	APPROVED		DRAWING NO.	REV. D
	DATE	TITLE		SHEET 3 OF 3	SCALE
	07.02.27	205 SKIDTUBE ASSEMBLY			1:24

W/O:		WORK ORDER CHANGES						
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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

NO. 232

AWS D17.1.2001
QUALIFICATION TEST RECORD

Name: Barclay Elliott
Job number: 59105
Part number: D205-634-041
Description: 205 skid tube
Welding Process: Tig[☒] Mig[]
Base material: Aluminium
Current: AC[☒] DC[]

TEST REQUIREMENTS AND RESULTS

Visual: pass[☒] fail[]
Penetration: pass[☒] fail[]

UNACCEPTABLE

Cracks: pass[☒] fail[]
Undercut: pass[☒] fail[]
Pin holes: pass[☒] fail[]
Overlap (cold lap): pass[☒] fail[]
Porosity (surface): pass[☒] fail[]
Coloration: pass[☒] fail[]

Qualifier P. J. Dunn Date of Test Coupon 10.06.01
Welder Barclay Elliott Date of Test Coupon 10.06.01

The above named individual is qualified in accordance with AWS D17.1.2001 to weld